MIE 578 Supply Chain Logistics
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Inventory Consolidation Project

The Bike & Ski Co. has two stores in Western Mass: one in E. Longmeadow and one in Easthampton. The two stores stock mostly identical items, but are managed independently. Each places its own orders and gets direct delivery from various suppliers. In an effort to reduce costs, the stores are considering leasing a warehouse facility in Holyoke to consolidate their inventory and place joint orders from suppliers.

To understand the benefits associated with coordinating their orders and inventory, the store managers have put together data on two representative products, and have hired your team of consultants to analyze the data, estimate the potential savings and provide recommendations. Demand and supply delivery data for the entirety of 2019 is given in the accompanying document PoolingData.xlsx. Shipping costs, product costs, inventory costs, and prices are provided below.

Best-Selling Junior Bike

- Replenishment lead time in weeks: L=2 weeks
- Fixed shipping cost of replenishment: $300 (trucking cost)
- Cost per bike: $100
- Price bike is sold at: $150
- Holding cost per bike is 20% of its value per year

Specialty Skis Imported from Sweden

- Replenishment lead time in weeks: L=5 weeks (ocean shipping)
- Fixed cost of replenishment: $100
- Cost per ski set: $1000
- Price skis are sold at: $1800
- Holding cost per ski set is 30% of its value per year
    - This is higher than the holding cost rate for bikes because of the risk of obsolescence for this fashion, high-end product

Managers at both shops strive to provide a 95% service level for each of its products. However, they are quite unsure as to whether this is the right objective to have and have lots of questions for your team:

- Is their service level target appropriate? Does it make sense to increase it or decrease it?
- Should it be different for the different products?
- Should they be looking at the cycle service level or the fill rate when measuring their performance and calculating their optimal policies? What difference does it make? How does it change the ordering policies to follow?
- What are the benefits of pooling the ordering and inventory of both locations?
    - What should be the inventory policy to follow for each product with and without pooling?
    - How does the target service level affect the benefits associated with pooling the inventory of both locations?

In addition, the managers are concerned about bike shortages occurring a few times over the year, when the supply delivery was delayed by a few days. They have provided the order delivery data

over the last year. They would like the team to analyze whether this should impact their ordering and inventory decisions.

Assignment

Your team of consultants needs to analyze the demand and order delivery data provided by the managers (see file PoolingData.xlsx), determine the benefits of pooling the ordering and inventory of items from both locations, answer all of the questions posed by the managers, and provide clear, detailed recommendations.

Grading Rubric

Report Presentation 10 points

- Clarity of report/easy to understand
- Organization
- Self-contained
- Good use of Figures and Appendix

Modeling 30 points

- Are appropriate models used?
- Are the assumptions clearly stated?
- Are the assumptions reasonable and justified? Pros and cons evaluated?
- Does the team consider the impact of the assumptions on the model results?

Analysis 30 points

- Appropriate cases are solved using the models proposed in order to address management questions.
- Sensitivity analysis if appropriate.
- Consideration of the impact of engineering solutions in global, economic, environmental, and societal contexts, showing good understanding of ethical and professional responsibility.
- Conclusions are well supported by the analysis and/or computational results

Recommendations 30 points

- Detailed set of actions for the organization to take or options to choose from.
- Recommendations are clearly justified and backed by the analysis performed
    - Assumptions that may impact the results should be clearly stated.
- Management's questions are clearly addressed in the recommendations.
- If more data and further analysis are deemed necessary, detailed description of what they would entail.